Excess Heat Registration in High Current Density Glow Discharge with Varrous Cathode Materials

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ABSTRACT

Experimental facts and results of heat and electric power measurements (including nuclear products) with various cathode materials are presented.

1. INTRODUCTION

Excess heat was registered with various cathode materials and high current density glow discharge in D_2, H_2, Ar using a continuous flow calorimeter. These measurements confirmed our previous results [1]. A continuous flow calorimeter measured excess heat in the glow discharge using system of measurements with better precision.

2.EXPERIMENTAL METHOD

Experimental device "Calorimeter-2" consists of vacuum chamber having a volume of 1200 cm^3, a gas pumping system, a water cooling system, a power supply and a measuring system [1]. The system of the measurements and methods was represented [1]. The system for excess power heat measurement was improved. The termoresistors were pairs of five silicon KTS 395A transistors. The water flow was stabilized in each channel. In experiments of a system Pd-D2, Pd-H2, Ni-H2, Ni-D2, Nb-H2 (cathode samples- a gas) were used. The various kinds of the pulses current were applied.

3.EXPERIMENTAL RESULTS

Excess heat was not observed by use the pulses current up to 100 A and duration up to 3-5 μs. Excess heat in a kind of thermal bursts was observed in a range of a current 20-60 mA. The frequency of the recurrence of thermal bursts changes for these currents from 6 minutes till 5-8 seconds (Fig.1-2). Large excess heat were registered for a system Ag-D2 at density of a current 20-50 mA / cm2 (Fig.2). Excess heat was observed for systems Ni-H2, Nb-H2 (cathode sample- - plasma gaze). Large excess heat for simple Pd samples are registered at the large loading D2 in Pd at small currents and at large currents (Fig.3). Excess heat is increased monotony with a increase of density of a current for special Pd samples (Fig.3). We presented before possible nuclear reactions of the fission [2] at energy 3-20 MeV on one reaction. The manufacture stable isotope- impurity is observed in Pd cathode samples (Fig.4).

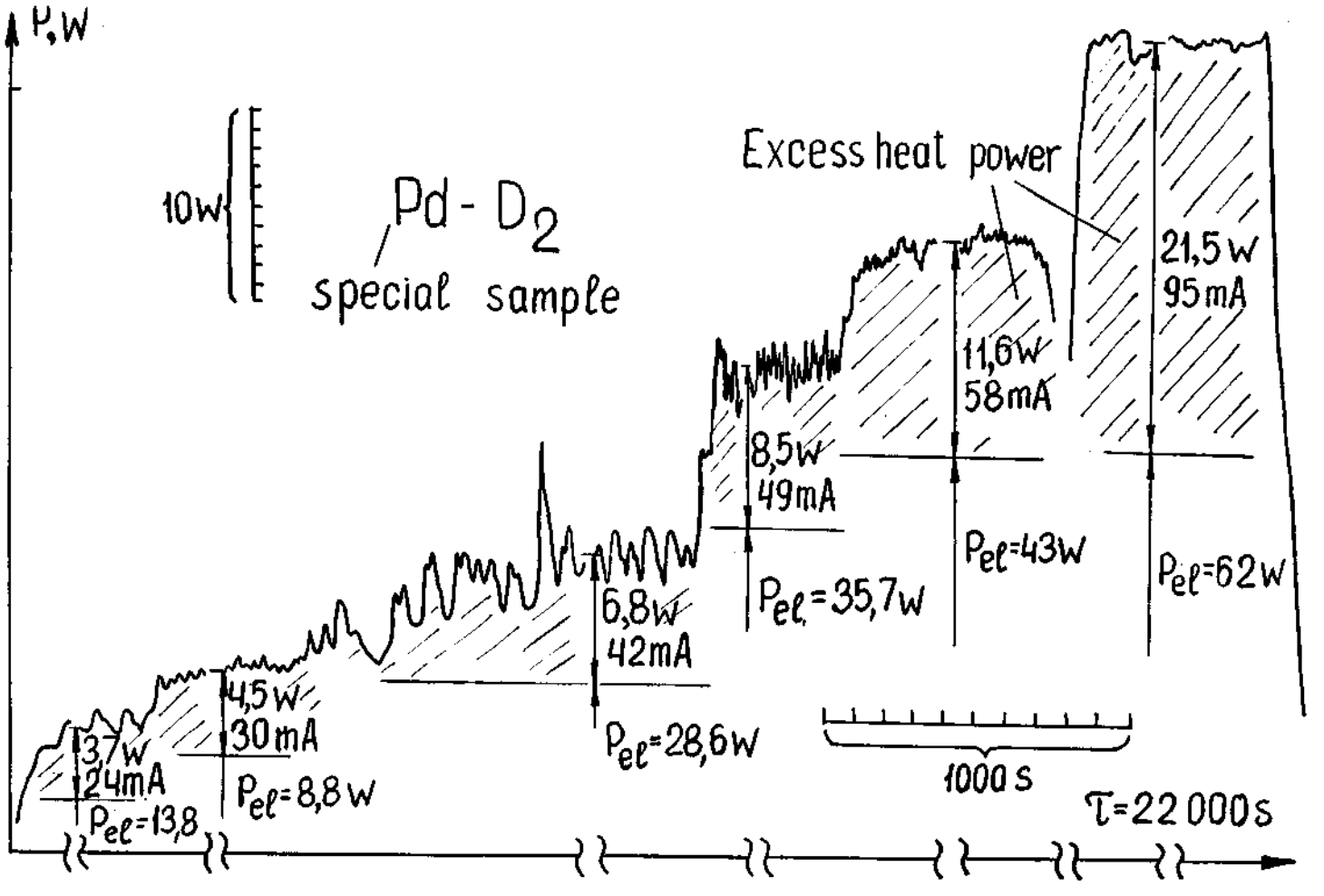

Fig. 1. Typical time dependence of heat power (Pd-D2) in continuous flow calorimeter.

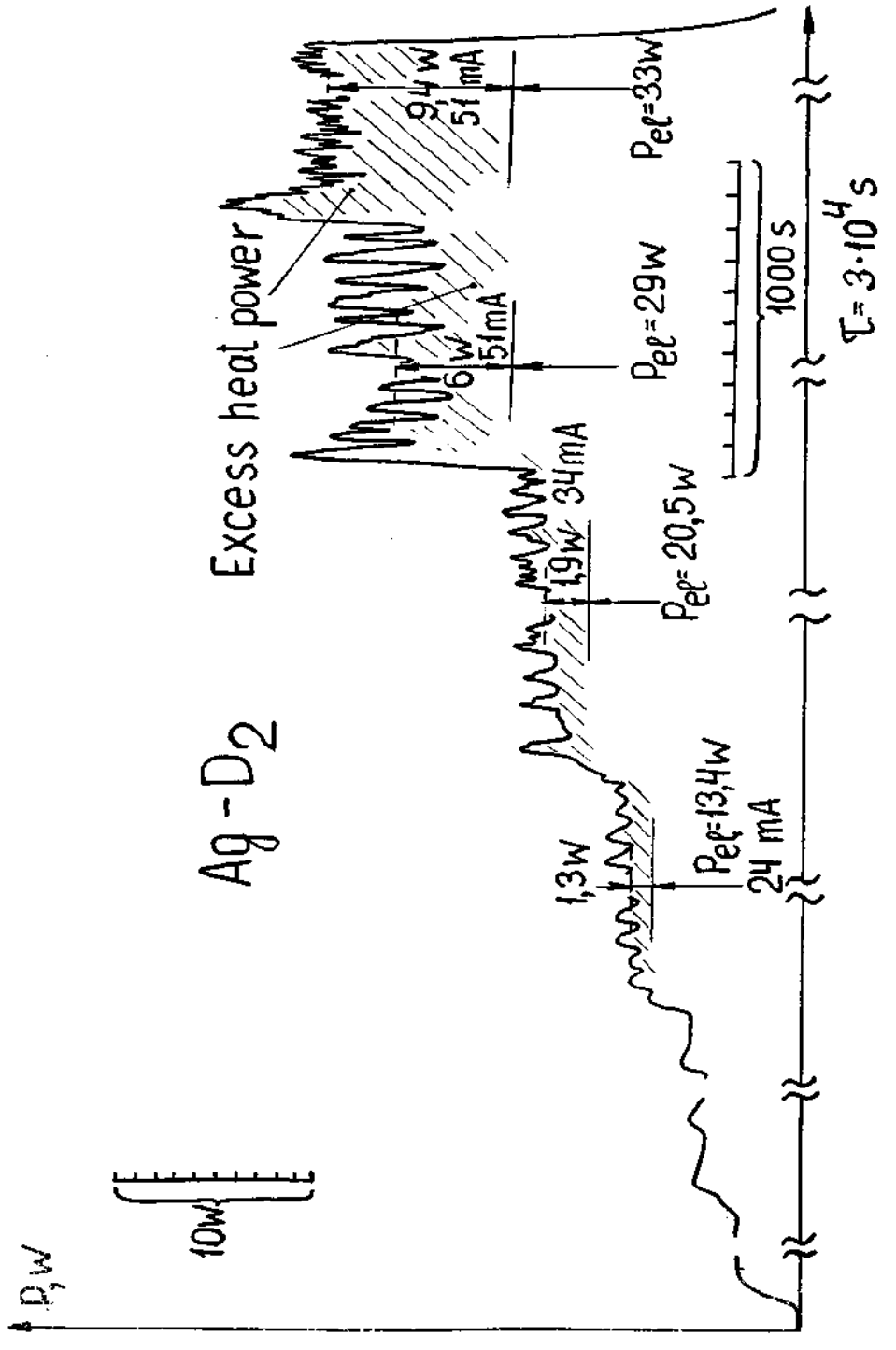

Fig. 2. Typical time dependence of heat power (Ag-D2) in continuous flow calorimeter.

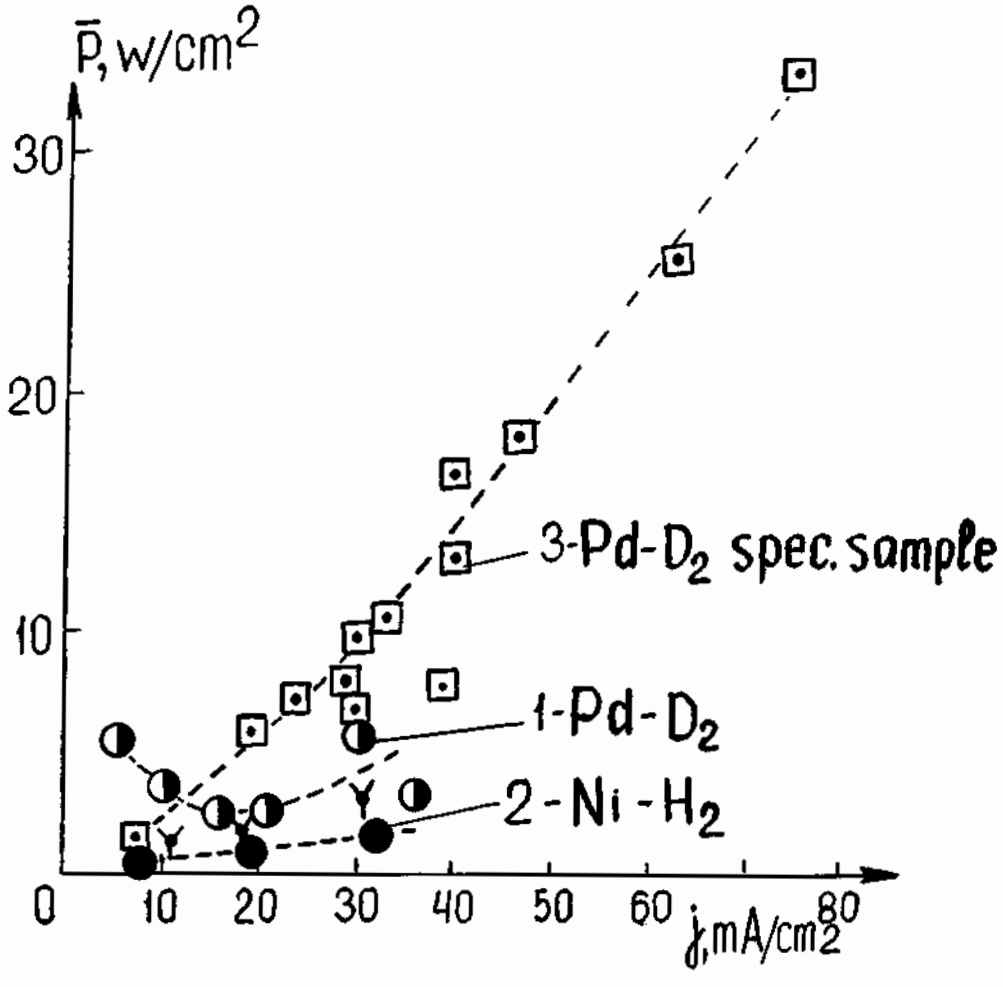

Fig. 5. Dependence of excess heat power on current density.

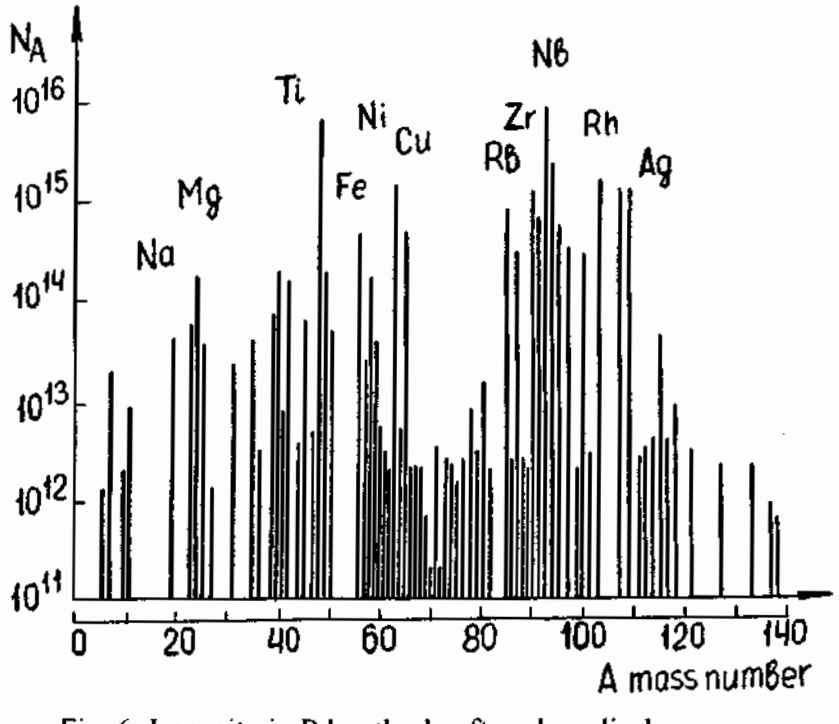

Fig. 6. Impurity in Pd-cathode after glow discharge.

4.CONCLUSIONS

The quantity of impurity corresponds to the complete value of excess heat. The comparison excess heat and of nuclear products (stable isotope) shows, that two types of nuclear reactions are observed: 1- with formation radioactive nuclides, which are observed practically for any working gases including Ar and cathode samples from the majority of metals with intensity 10^{2}-10^{3} s^{-1} , 2- reactions proceeding for some metals with H_2 and with D_2 by intensity 10^{11}-10^{12} s^{-1} and forming stable nuclides with excess heat without decelerated γ- radiation .

REFERENCES

1. A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova, "Excess heat measurements in glow discharge using flow "Calorimeter-2" *Proc, of the* 5th *International Conf. on Cold Fusion*, April 9-13, 1995, Monte-Carlo, Monaco, p.223-226.

2. A.B. Karabut, Ya.R. Kucherov, I.B. Savvatimova, "Possible nuclear reactions mechanisms at glow discharge in deuterium", Frontiers of cold fusion , *Proc, of the Third International Conf. on Cold Fusion*, October 21-25, 1992, Nagoya, Japan, p. 165.